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JUN 23 1968



1968

**DEPARTMENT OF
WATER & SEWERS
ANNUAL REPORT**

**CITY OF CHICAGO
Richard J. Daley, Mayor**

CHICAGO CITY COUNCIL



HON. RICHARD J. DALEY

Mayor

MATTHEW J. DANAHER (a)
President Pro Tem

JOHN C. MARCIN
City Clerk

MORTON GORDON
Deputy City Clerk

ALDERMEN

Ward

1. Fred B. Roti
2. William H. Harvey (b)
3. Ralph H. Metcalfe
4. Claude W. B. Holman
5. Leon M. Despres
6. A. A. Rayner, Jr.
7. Nicholas J. Bohling
8. William Cousins, Jr.
9. Dominic J. Lupo
10. John J. Buchanan
11. Matthew J. Danaher (a)
12. Donald T. Swinarski
13. Casimir J. Staszczuk
14. Joseph P. Burke (c)
15. Joseph J. Krska
16. Paul M. Sheridan
17. William H. Shannon
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19. Thomas F. Fitzpatrick
20. Kenneth E. Campbell
21. Wilson Frost
22. Otto F. Janousek
23. Frank J. Kuta
24. George W. Collins
25. Vito Marzullo
26. Stanley M. Zydlo
27. Harry L. Sain
28. Joseph Jambrone
29. Robert Biggs
30. Edwin H. McMahon
31. Thomas E. Keane
32. Robert J. Sulski (d)
33. Robert Brandt
34. Rex Sande
35. Casimir C. Laskowski
36. John F. Aiello
37. Thomas J. Casey
38. William J. Cullerton
39. Anthony C. Laurino
40. Seymour Simon
41. Edward T. Scholl
42. Mayer Goldberg (d)
43. G. Barr McCutcheon
44. Thomas Rosenberg (d)
45. Edwin P. Fifielski
46. Joseph R. Kerwin
47. John J. Hoellen
48. Robert J. O'Rourke
49. Paul T. Wigoda
50. Jack I. Sperling

- (a) Resigned September 20, 1968
(b) Resigned December 20, 1968
(c) Deceased May 11, 1968
(d) Resigned November 29, 1968

Robert F. Campbell
Record Clerk

Michael Colleta
Sergeant-at-Arms

Clement J. McDermott
Assistant Sergeant-at-Arms

Alec Busta
Assistant Sergeant-at-Arms

Arthur Varchman
Assistant Sergeant-at-Arms

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ISSUED TO

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DEMCO

serve. And finally, we extend our sincere thanks also to the Department's loyal employees for their dedicated service in contributing to the achievements of the past year.

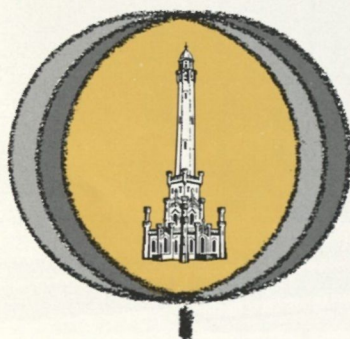
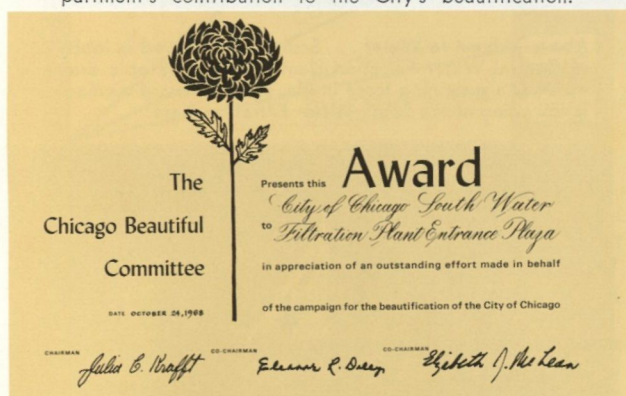
Respectfully submitted,

James W. Sullivan
Commissioner

HIGHLIGHTS



In behalf of the Chicago Beautiful Committee, Mayor Richard J. Daley presents an award to Commissioner James W. Jardine in recognition of the Department's contribution to the City's beautification.



The Old Water Tower symbolizes the history of Chicago and signifies the great faith of her early citizens in their City's future. It stands as a memorial to the victims of the Great Fire and to the indestructible will of a noble City to succeed.

- During 1968, investments in capital improvements of the Chicago Water System totaled \$11,293,330. Programmed expenditures for capital improvements over the period of 1969 to 1973 call for the investment of \$97,718,000.
- Total receipts of the Water Collection Division amounted to \$58,223,430.56. Of this amount, \$58,156,524.64 was collected for Water Fund Revenue items.
- A total of 374,889 million gallons of water, averaging about 1,024 million gallons per day, was pumped through the water distribution system during the year.
- More than 27 miles of new water mains and 26.24 miles of new sewers were constructed in 1968. Also, 760 new catch basins and 967 new man-holes were added to the sewer system.
- A total of 567,831 water samples were laboratory tested during the year—an average of almost 65 tests for each hour of every day.
- Bureau of Sewers survey forces ran 142 miles of precise levels to establish elevations of 38 bench monuments and 127 new street grades.
- Conversion of boiler equipment in the five steam operated pumping stations to gas fuel (with oil as a secondary fuel) progressed on schedule. The present program calls for the conversion of all coal fired boilers to gas fuel by 1972.
- The South Water Filtration Plant's entrance plaza won an award for its outstanding contribution to the beautification of the City from the Chicago Beautiful Committee in October of 1968.
- A consulting engineer was employed to study alternate methods for disposing of sediment at the filtration plants.
- The Department's 1968 safety record showed the Bureau of Water's Accident Frequency Rate to be less than half of the latest national average for water utilities, as published by the National Safety Council, and its Severity Rate to be only 27.57 percent of the national average.
- The In-Service Supervisory Training Program was completed by 160 middle and upper level supervisors in June of 1968. The initial class of a second supervisory training course was held during October for the purpose of helping 200 key personnel learn more about activities of all units of the Department and other government agencies.
- A seven-year program was initiated during the year, which, when completed, will result in total automation of the South Water Filtration Plant chemical feed system. Ultimately the plant will be monitored by a computer-data logger, similar to that now in use at the Central Water Filtration Plant.
- New records for peak hour and total daily pumpages were established in 1968 when, on August 22, more than 1,666 million gallons of water were pumped for the day, including a record-breaking hourly rate of 2,207 million gallons-a-day at 4:00 P.M.
- A total of 21,479 persons took part in guided tours through the Central Water Filtration Plant during 1968. Guests included 310 foreign dignitaries, engineers, scientists and others, from 40 different countries.



Above—**Hymn to Water** . . . Sculpture displayed in lobby of Central Water Filtration Plant portrays the epic drama of water as a sustaining force in life. Below—Award-winning landscaping at the South Water Filtration Plant.

A COMMUNITY ENTERPRISE

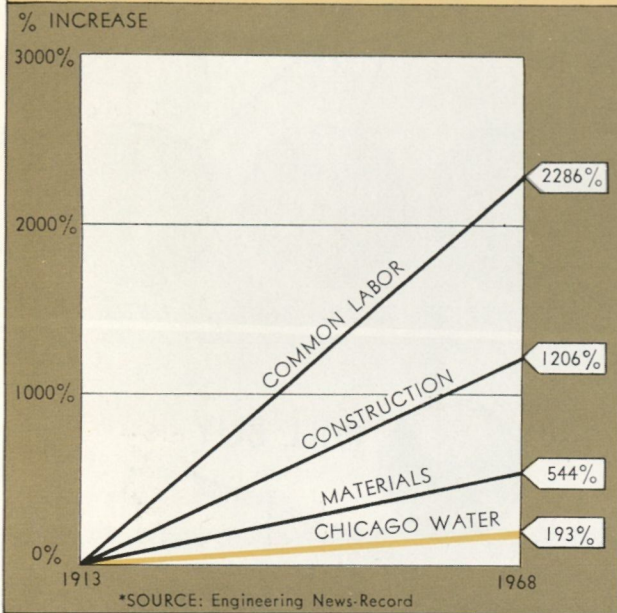
As the population of the world grows, the demand for products and services increases. Nearly all industries are affected—some only to a minor degree, others significantly, depending upon how essential they are for the preservation of life and to the welfare of humanity. A profound change has taken place during the past century in the general disposition and opinion of people in the more affluent parts of the world, especially the United States of America. What are now considered absolute requisites for human existence would have been regarded as luxuries not too many years ago.

Water is a basic necessity for the sustenance of human life. But by no means should the import of the many other vital provisions that are furnished by Nature and the cooperation of governmental and private industries be minimized. With the surge toward mutual dependence among the utilities and organizations that provide the materials for adequate distribution of water, light, heat and proper food and for the services related to health, sanitation, transportation, communication, education and protection against fire and crime, an interdependence of functions has developed to the extent that an atmosphere of community enterprise prevails throughout the Nation.

All human activities, whether they be of a domestic, commercial or industrial nature, depend to some degree upon water. The services provided to consumers of water by the Chicago Water System (which is actually owned and controlled by the Chicagoans it serves) have established an admirable record for the Department. It is a rare occasion when a water user is cut off from his supply. Connections to the water distribution system are usually made while the line remains in service so that the water supply will not be inter-



PERCENT INCREASE IN COSTS
NATIONAL CONSTRUCTION*
VERSUS
CHICAGO WATER
DEC. 31, 1968 (1913=100%)



THE CITIZENS OF CHICAGO OWN AND CONTROL THEIR WATER SUPPLY SYSTEM. IT IS A COMMUNITY ENTERPRISE, SELF-SUPPORTING AND NOT FOR PROFIT, AND FUNCTIONS WITHOUT ANY INCOME FROM TAXES.



Engineering students from Illinois Institute of Technology assemble for tour through Central Water Filtration Plant.

rupted. In order to keep inconveniences caused by water leaks at a minimum and to control water wastage, the Water Distribution Division follows an active plumbing inspection program. During 1968, approximately 56,480 inspections of water facilities were made. When inspectors discover leaking fixtures, they report their findings, and notices are sent to consumers informing them that proper repairs must be made. Without a method of this kind, the wastage of water through leaky plumbing fixtures, such as faucets, water closets and sill cocks, would be measured in thousands of gallons per day. The inspection and repair of fixture leaks contribute greatly to a reduction in the total water needs of the vast area serviced by the Chicago Water System.

Also, during the year, 2,064 miles of underground water mains were tested for possible leakage. Specially trained engineers are furnished with modern electronic leak detection equipment needed for this purpose to insure a tight water distribution system.

At the end of 1968, there were 45,864 fire hydrants in use. These hydrants were inspected regularly by permanent crews assigned by the Water Distribution Division, in close cooperation with the Chicago Fire Department, to guard against their becoming inoperable because of damage by ice or for other reasons. The Bureau of Water is also depended upon to provide an adequate quantity of water at suitable pressure at each hydrant for fighting fires.

It is worthy to note at this point that the Chicago Water System has maintained a remarkably high rating with the American Insurance Association (formerly the National Board of Fire Underwriters) in terms of ability to fight fires since the inception of this Department in 1953—an admirable achievement for a city of this size.

At the termination of 1968, the charge for water furnished by the Department of Water and Sewers had remained the same since June of 1961. The costs incurred by the Bureau of Water in providing this service, however, have steadily mounted as a result of the rising prices of other essential commodities and services. Nevertheless, the Chicago Water System continues to be entirely self-supporting and it functions without any outside income from real estate or other taxes.

Products of cooperation of the Departments of Water and Sewers and of Public Works are the world's two largest water filtration plants. Both plants added substantially to the beauty of the City's lakefront as well as to the value and effectiveness of its water system. During 1968, the Department was presented an award by the Chicago Beautiful Committee in recognition of the fine appearance of the entrance plaza of the South Water Filtration Plant as an outstanding contribution to the City's appearance.

An impressive illustration of both interdepartmental and intradepartmental coordination is the construction of the raw water tunnel connection of the William E. Dever Crib and the Central Water Filtration Plant, in which the Water Purification and the Pumping Station Operation Divisions of this Department and the Bureau of Engineering of the Department of Public Works

are involved. When this connection has been completed in 1969, the Dever Crib and tunnel will provide another raw water intake for the Central Filtration Plant.

Following Mayor Richard J. Daley's lead in the efforts to reduce air pollution from all sources to a minimum, the Department of Water and Sewers is carrying out the plans devised during 1967 to convert the City Water System's five steam-operated pumping stations to use gas fuel (with oil as a secondary or stand-by fuel) instead of coal.

The willingness of employees of various City Departments to help Chicagoans and suburbanites in trouble was especially apparent in January of 1967, when a record snowfall almost paralyzed Chicagoland. Every resource of the City's available manpower and equipment was assembled to clear the main thoroughfares. During April of that same year of the unprecedented blizzard, Chicago was again subjected to Nature's wrath when a tornado left a path of havoc across the southwestern section of the City and the neighboring suburb of Oak Lawn. Departments again were united in their efforts to clean up the debris. Fortunately, the year of 1968 produced no such natural emergencies.


The problem of water pollution is by no means new. Yet, it is relatively recent that this menace to the condition of Lake Michigan has been further complicated by such situations as increased population, expansion of industry, and a new outlook regarding the quality of water and the source of its supply. Here again the growing spirit of community enterprise is manifested in the battle to clean up Lake Michigan.


Bureau of Water technicians have for years been devoting ever-increasing amounts of time and effort to monitoring water at the southern end of Lake Michigan and the tributary streams. Data is collected to aid federal, state and local pollution-control agents in solving water pollution problems.

Mayor Richard J. Daley has shown a continuing concern for the condition of the City's water supply and laws have been amended by the Chicago City Council in 1967 to provide even stricter regulations regarding the disposal of wastes from pleasure boats and commercial vessels and industrial and domestic discharges of pollutants. During 1968 considerable progress was made toward implementation and compliance with the Municipal Code, as amended.


Valuable statistics based upon over 20 years of regular surveys conducted by the Water Purification Division were presented by the Department of Water and Sewers at a conference convened by the United States Public Health Service and held in Chicago during March of 1965. As a result of this conference, a Technical Advisory Committee was formed to establish criteria for the evaluation of water, and in January of 1966, these criteria were adopted by Illinois, Indiana and the Federal Water Pollution Control Administration.

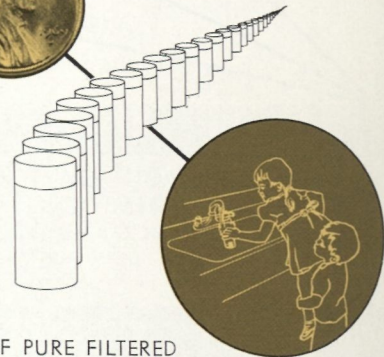
Early in 1968, a Four-State Water Pollution Conference was called by the United States Department of the Interior (as requested by Governor Otto Kerner of Illinois) for further discussion on the subject of pollution abatement. This meeting provided opportunity for Mayor Daley and representatives of the Department of Water and Sewers to express their concern and to call for a uniform and systematic approach to preserve a most valuable natural asset.

10c  WILL BUY



1 NEWSPAPER OR 1 CANDY BAR OR 1 PHONE CALL

1c  WILL BUY



760

GLASSES OF PURE FILTERED WATER DELIVERED TO YOUR TAP.

AN AMPLE, ECONOMICAL SUPPLY OF PURE WATER IS VITAL TO EVERY COMMUNITY.



Food is served to Departmental employees who worked around-the-clock helping to clean up debris after 1967 tornado.



Visitors observe Control Center. Panel in right background records and indicates all phases of plant operations.



The Central-Plant's filters are automatically controlled and half of them are operated from this control panel being observed by visitors.



Visitors view Central Water Filtration Plant pump room with its eight pumps having a total pumping capacity of 1,700 million gallons per day.

The responsibilities and activities of the Water Purification Division include: the operation and maintenance of the world's two largest water filtration plants; the supervision of the sterilization of new and repaired water mains, tunnels and shafts; the surveillance of dredging and dumping operations in Lake Michigan; the review of plans in terms of accepted standards for new suburban water system facilities; the making of water quality surveys; the analysis of field data relating to supplying safe potable water to consumers; and the operation of the purification laboratory, which conducts investigations to assure satisfactory water quality throughout the system.

The Chicago Water System's raw water is obtained either from the shore intakes of each of the water filtration plants or from cribs located some three miles in the Lake. Since raw water obtained from the cribs is generally of a higher quality than water from the shore intakes, the South Water Filtration Plant uses the Edward F. Dunne Crib (two miles from shore) as its source of supply for a greater amount of time than it uses its shore intakes.

The Central Water Filtration Plant, which is presently restricted to the use of its shore intakes, will also have a second source of raw water when the tunnel connection with the William E. Dever Crib (a little over two and one-half miles from shore) is completed in 1969.

Lake water enters the cribs, which stand in water from 32 to 35 feet deep, through ports located near the bottom. The water rises around the outside of a center shaft until it reaches a point higher than the ports where it passes through screens and flows downward inside the shaft to the large supply tunnels approximately 200 feet below Lake level.

The water flows by gravity through the tunnels to intake basins and then to the pumps in the filtration plants, or water is obtained by the plants through their shore intakes. Traveling screens in the intake structure remove fish, aquatic plants and debris. The low lift pumps raise the water high enough to provide sufficient gravitational energy so that it will flow continuously through the filtration process in the plant. It passes through the chemical application channels, then coagulation and settling basins and finally through the rapid sand filters before entering the storage reservoirs. From these reservoirs the water flows by gravity through water tunnels to the pumping stations.

Water treatment processes include: the addition of chlorine to sterilize the water; aluminum sulfate (alum) and chlorinated ferrous sulfate (iron sulfate) to aid coagulation in the precipitation and settlement of impurities; lime to reduce corrosion of pipes; anhydrous ammonia to eliminate chlorine tastes and lengthen the action of the chlorine on bacteria; activated carbon to remove other tastes and odors; and fluorides to reduce dental caries in children. A caustic soda system has been installed at the Central Water Filtration Plant, as a supplement to the use of lime.

When water mains have been repaired or new mains have been installed, prior to being put into service, they are flushed and sterilized with chlorine for 24 hours. Water samples are taken at various locations and tested by the Water Quality Surveillance Section to make certain that the mains are effectively sterilized.

The purification laboratory was provided with new items of equipment and methods for use in analysis and surveillance procedures. They include:

The Atomic Absorption Spectrometer, used to determine trace quantities of metal in water accurately and speedily;

The Infrared Spectrophotometer, used primarily in connection with pollution surveys, for identification of organic water pollutants;

The Gas Chromatograph, used by itself or in conjunction with the Infrared Spectrophotometer, as a means of separating and accurately identifying organic substances; and

The membrane filter technique for more efficient determination of coliform organisms.

A scale-model pilot filtration plant was constructed by the Water Purification Division. The processes of coagulation, taste and odor removal, and sterilization can now be more effectively studied for the purpose of further improving the treatment and filtration methods currently being followed in Chicago's two filter plants. The efficiency of various coagulation materials and accessories will be evaluated by experimentation. Agents other than activated carbon will also be tested in taste and odor experiments.

A total of 567,831 water samples were tested in the plant laboratories in 1968. The electron microscope, which was used for 5,338 examinations, proved especially valuable at those times when it was necessary to obtain quick analytical results.

The control laboratory in each filtration plant is staffed 24 hours a day to provide the information needed to insure that changes in the raw water quality will be detected promptly so that chemical treatment can be adjusted to meet new conditions.

More than 374 billion gallons of water were treated and supplied to the pumping stations during the year. A total of 40,380 tons of chemicals were used in the treatment processes to guarantee that the final product is of the highest quality and sparkling clarity.

A net was installed in front of the Central Water Filtration Plant shore intakes again in 1968, the third year that this procedure has been followed as a method of diverting fish, especially alewives, to prevent clogging of the plant intake screens. This year the net remained in place from early April to late June, a shorter period than was necessary for the previous two years, and the plant did not suffer any serious alewife problems. The net is scheduled to be placed in service again next Spring.

A total of 21,479 visitors toured the Central Water Filtration Plant during 1968. Regular tour guides conducted most of the visitors on their trips through the plant, while groups of technicians and professionals interested in water purification methods were guided by filtration engineers. Over 300 foreign dignitaries, engineers and scientists from 40 different countries toured the plant guided by Department engineers.

During the Summer, plant tours for the public were arranged on Tuesdays, Thursdays, Saturdays and Sundays of each week, between the hours of 1:00 P.M. and 5:00 P.M. After August 31st, such tours were conducted only on Saturdays and Sundays, but it is expected that the Summertime schedule will become effective again in Spring of 1969.



Visitors observe as one of the chemical application panels controls the feeding of alum, lime, ferrous sulfate and carbon to the west half of the plant.

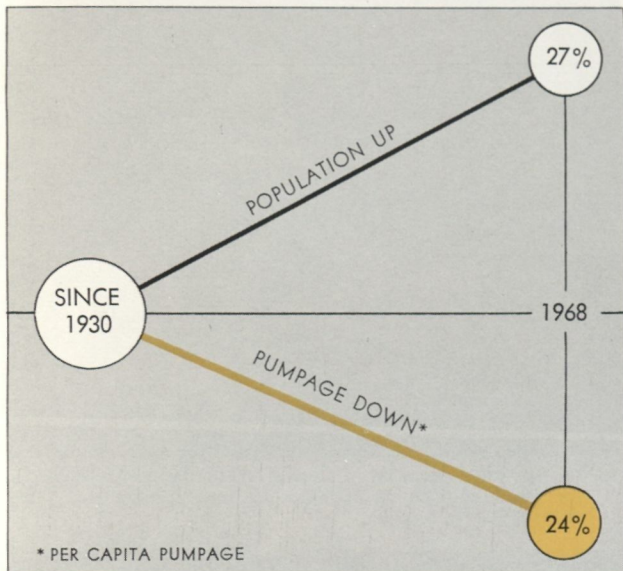


Control laboratory, in which chemical tests are continuously being made, captures interest of visitors.



Chemists are running phenol determinations on Calumet River water samples.

THE CHICAGO WATER SYSTEM SERVICE AREA



The Pumping Station Operation Division is responsible for the operation and maintenance of four water intake cribs (one in service and three on stand-by), the water supply tunnels and shafts, and the eleven pumping stations of the Chicago Water System. Six of the pumping stations are operated by electric power and five by steam. They are located strategically so that adequate pressure can be provided for reliable distribution of pure water.

During 1968, a total of 374,889 million gallons of water was pumped by the stations. While the year's daily average of 1,024 million gallons indicates an increase of 19 million gallons a day when compared with the prior year, it did remain considerably below the daily average for 1930. This reduction occurred even though the number of persons served by the Chicago Water System has grown by over one-half million and the demands of expanded industry have increased tremendously during the intervening 38 years. This does not mean that the amount of water actually used by individual consumers has diminished. Rather, it testifies to the Department's diligence in minimizing the loss of water through leaks and eliminating losses that might be caused by inefficient maintenance procedures or inadequate equipment.

New records for peak hour and total daily pumpages were established in 1968 when, on August 22, more than 1,666 million gallons of water were pumped for the day, with the highest hourly rate of 2,207 million gallons a day at 4:00 P.M.

In compliance with the air pollution control ordinances of the City of Chicago, which limit the emission of sulfur dioxide into the air, the Department has started converting the boiler equipment in the Water System's five steam operated pumping stations to use gas fuel (with oil as a secondary fuel). The fuel conversion program was initiated at the Western Avenue Pumping Station, and one of that station's gas fired boilers has been in operation since December 30, 1968. The total program was accelerated so that conversion of boilers at all steam operated pumping stations can be anticipated within the next four years. Also, during 1968, tests were conducted to enhance the boiler plants' efficiency and improve operations.

Prior to the conversion of one of the Western Avenue Pumping Station's boilers to use gas as a fuel rather than coal, it was necessary to keep two pumping units in service during morning hours to insure reliable operation. Thus, the distribution pressure was raised higher than recommended for that time of day. After the boiler was converted in December, however, it was possible to operate only one pump during this period. This enabled the distribution pressure to be reduced to normal without sacrificing reliability.

The new Lake View Pumping Station, with its smaller sized pumps, was utilized by the Pumping Station Operation Division during 1968 in relieving the Thomas Jefferson Pumping Station of its water demand problems.

The Pumping Station Operation Division is responsible also for the operation of the Hegewisch Sewage Pumping Station, located in Chicago's extreme southeast area. During the year, a gas engine on one of the pumping units of the station, which is used to dispose of storm water from the Hegewisch area, was replaced. The original pumping unit was installed 60 years ago.



Upper—Looking down outlet shaft for Mayfair Pumping Station pressure tunnel. Lower—The tunnel's drift near shaft's bottom at that time.

DISTRIBUTION

Facilities of the Chicago Water System presently include over 4,117 miles of ductile iron, steel, cast iron, and concrete pipe varying in size from four to 60 inches in diameter, 45,864 fire hydrants and 42,658 valves. Maintenance of this complex distribution system is the responsibility of the Water Distribution Division. (The figure for mileage of pipe in current use does not include the suburban water system networks receiving water from the Chicago system.)

In keeping pace with the constant growth and development of the City of Chicago, divisional construction crews installed 27½ miles of water mains during 1968. Approximately 32% of these new mains were 24 inches in diameter or larger. In addition, 449 new valves and 306 new fire hydrants were added.

The Capital Improvements Program for the next five years includes \$38,862,000 for permanent improvements in the water distribution system.

During the year, about 21,439 feet of 24-inch and 48-inch diameter cast iron feeder mains were cleaned and lined with cement. These water mains have been in use for many years, and, to avoid pressure losses caused by friction due to deterioration of the pipe over the years, this procedure was followed. The Water Distribution Division's method of cleaning and lining pipes increases both pipe capacity and the life expectancy of the pipes, thus reducing the need for new feeder main construction. It is planned that during 1969 an even greater quantity of cast iron pipe will be similarly cleaned and lined.

Also in 1968, mains continued to be electronically monitored for underground leaks and a plumbing inspection and reinspection program was pursued intensively in building structures—all for the purpose of minimizing leakage while supplying potable water.



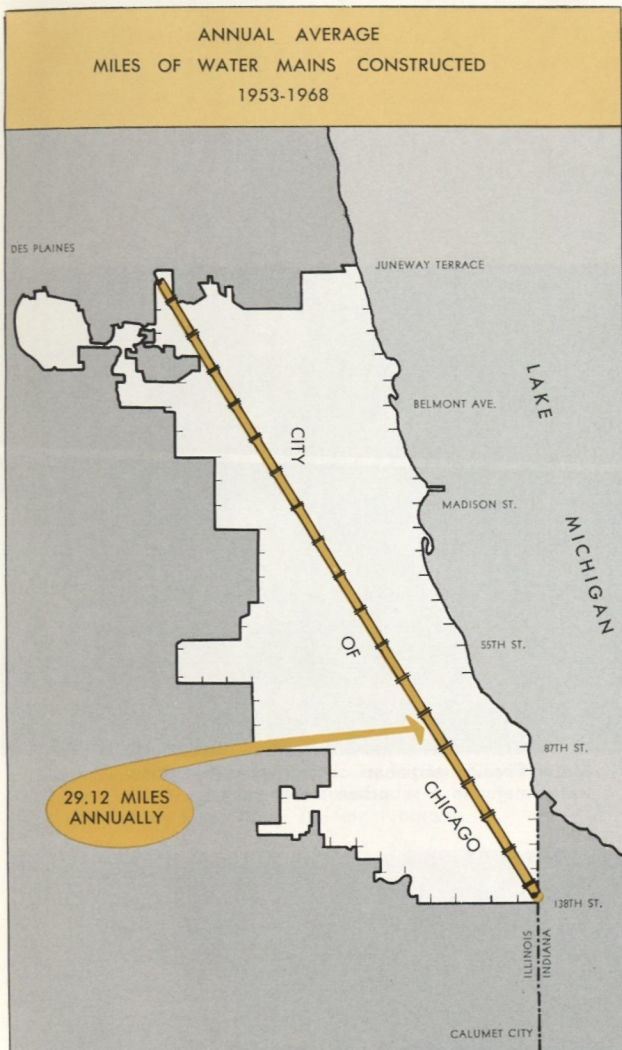
The Computer Terminal in Central Water Filtration Plant from which engineering problems are transmitted to I.B.M. office for solution.



Side connection to Berteau Avenue feeder main is being installed at Melvina Avenue.



Engineer inspects 98-year old main in Chicago Avenue water pipe tunnel under Chicago River prior to its scheduled replacement.



Water mains are laid in various areas—but, if the average amount of mains constructed each year since 1953 were placed in a straight line, it would be 29 miles long.



Water needed for developments near the Union Stock Yards will be provided through 36 and 12-inch water mains in 43rd Street, just east of Loomis Street.

A 78-inch pressure tunnel, 850 feet in length, was under construction in 1968. The pressure tunnel is connected to the discharge header of the Mayfair Pumping Station and runs under the Kennedy Expressway to a valve vault on Wilson Avenue, 150 feet west of Laporte Avenue. Upon completion in 1969, the pressure tunnel will be connected to the 60-inch diameter water main leading westward to O'Hare Airport.

In this way, an alternate supply of water to the airport facility will be provided as well as a more adequate and dependable supply to the City's northwest side and the northwestern suburban communities served by the Chicago Water System.

A 24-inch water main in the West Chicago Avenue water pipe tunnel under the North Branch of the Chicago River was examined in September of 1968, during the construction of the Chicago Avenue-Halsted Street viaduct bridge. The exterior of the riser (vertical) pipe in the west shaft of the tunnel was discovered to be badly corroded and the restraints on the upper bends had deteriorated. A small leak in a defective casting was also detected. Fortunately, however, when the tunnel and shafts were dewatered, the tunnel was found to be in good shape. Because of the extensive corrosion of the 98-year old water pipe in the tunnel, the main's replacement was planned to be completed in 1969.

The installation of the Telemetric Data Amassing System progressed during 1968. Eventually, new stations will be added to the 32 units that were installed this year so that the system will include a total of 300 stations. When completed, the Telemetric System will provide for speedier collection of water pressure information over leased telephone lines. Such data will be transmitted to the Water Distribution Division offices at the Central Water Filtration Plant for graphic recordation at the central control board and ultimately will be coordinated with the plant's computer system.

During the year covered by this report, the four suburban communities of Crestwood, Palos Heights, Palos Hills and Worth were added to the list of those supplied with water through the operations of the Chicago Water System.

In compliance with the Sanitary District Act of 1889, as amended, charges for water sold to municipalities located within the Metropolitan Sanitary District are based on the same metered rate that applies to users in the City of Chicago. Some of the municipalities not adjoining Chicago receive City water through the facilities of other communities that are directly connected to Chicago.

CITY OF CHICAGO

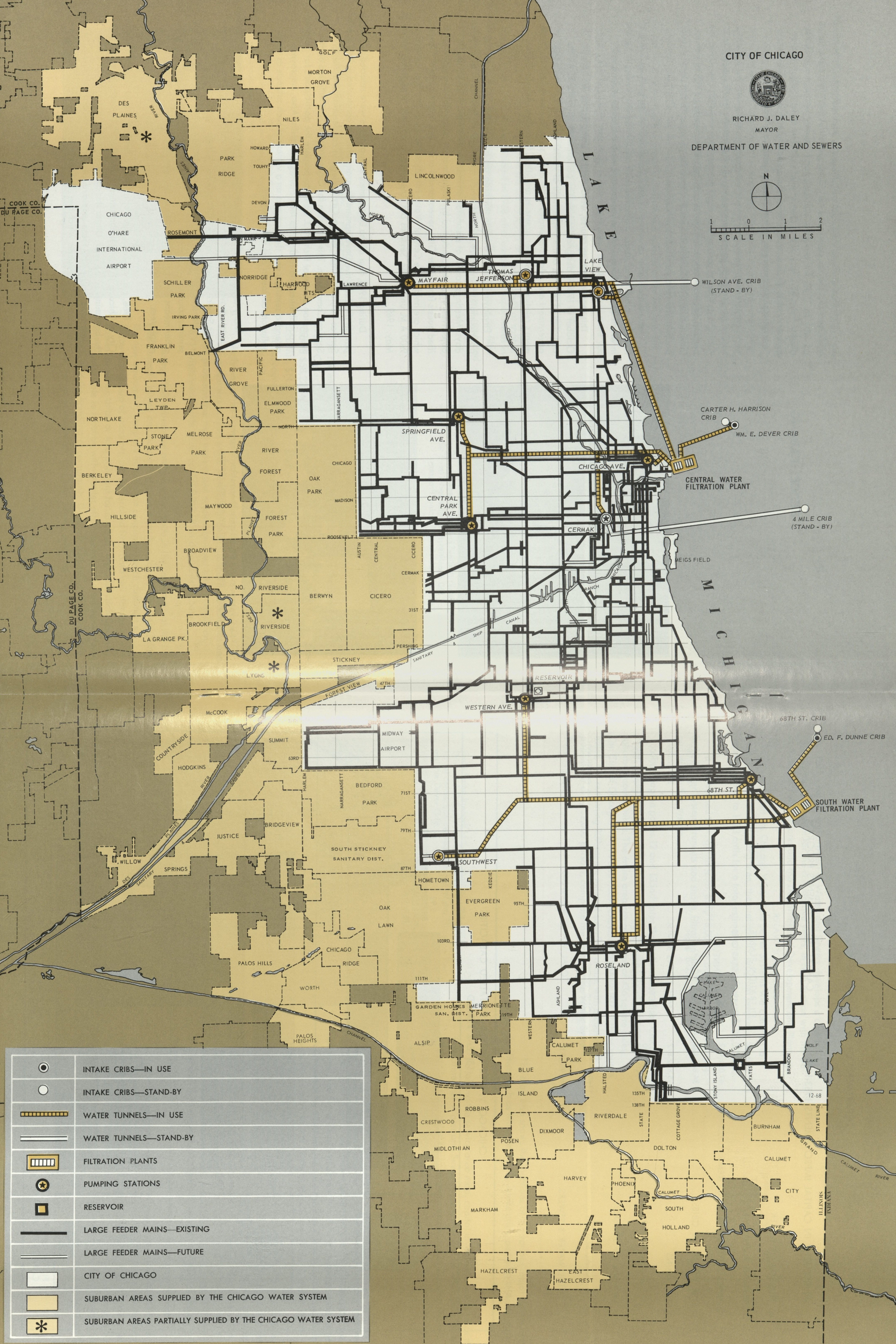


RICHARD J. DALEY
MAYOR

DEPARTMENT OF WATER AND SEWERS



1 0 1 2
SCALE IN MILES



	INTAKE CRIBS—IN USE
	INTAKE CRIBS—STAND-BY
	WATER TUNNELS—IN USE
	WATER TUNNELS—STAND-BY
	FILTRATION PLANTS
	PUMPING STATIONS
	RESERVOIR
	LARGE FEEDER MAINS—EXISTING
	LARGE FEEDER MAINS—FUTURE
	CITY OF CHICAGO
	SUBURBAN AREAS SUPPLIED BY THE CHICAGO WATER SYSTEM
	SUBURBAN AREAS PARTIALLY SUPPLIED BY THE CHICAGO WATER SYSTEM

THE CHICAGO WATER SYSTEM SERVICE AREA - 1968

DEPARTMENT OF WATER AND SEWERS

INVESTMENT IN CAPITAL IMPROVEMENTS 1953-1968

BUREAU OF WATER:

FILTRATION PLANTS	\$118,225,504
PUMPING STATIONS & MISC. ITEMS.....	47,051,402
WATER TUNNELS & CRIBS.....	34,863,122
WATER MAINS	95,832,872
TOTAL WATER	\$295,972,900

BUREAU OF SEWERS:

TOTAL SEWERS	\$149,012,339
TOTAL WATER & SEWERS.....	\$444,985,239

CAPITAL IMPROVEMENTS PROGRAM 1969-1973

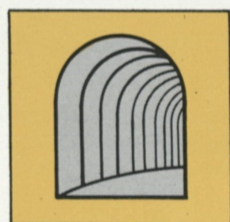
BUREAU OF WATER:

FILTRATION PLANTS	\$ 14,590,000
PUMPING STATIONS	18,966,000
WATER TUNNELS	25,300,000
FEEDER MAINS: 24" dia. and larger.....	11,560,000
SMALL MAINS & MISC.	24,302,000
MISCELLANEOUS	3,000,000
TOTAL WATER	\$ 97,718,000

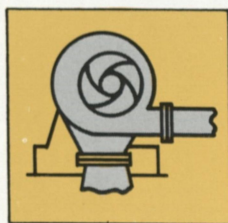
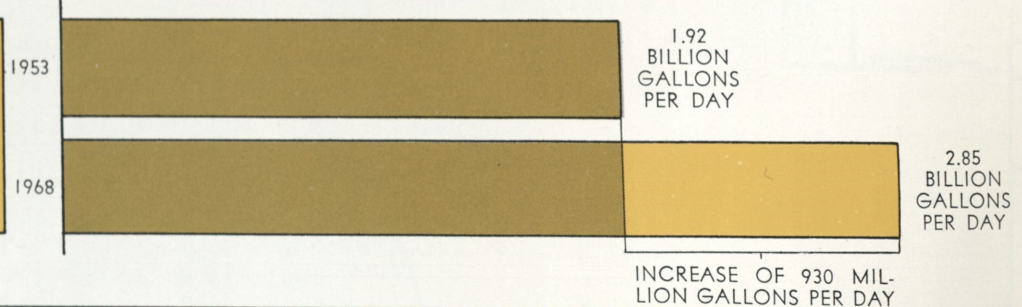
BUREAU OF SEWERS:

BOND PROGRAM—SEWERS	\$ 86,355,000
TOTAL WATER & SEWERS.....	\$184,073,000

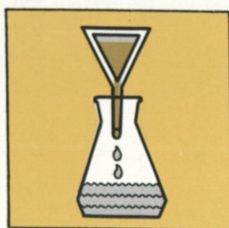
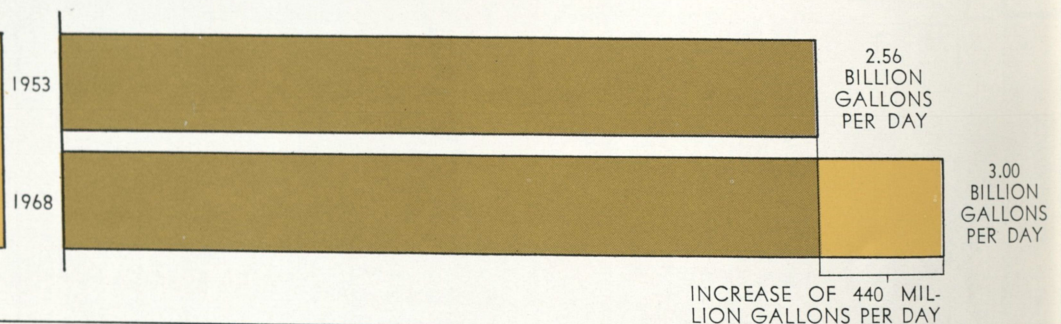
CHICAGO WATER SYSTEM—INSTALLED CAPACITIES 15-YEAR PERIOD



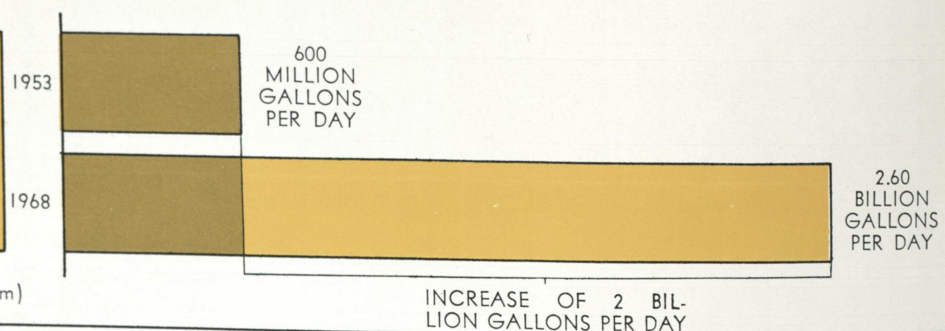
TUNNEL
CAPACITY



PUMP
CAPACITY



FILTER PLANT
CAPACITY (Maximum)



Each year the Department of Water and Sewers develops a capital improvements program for the coming five years, in cooperation with the Department of Public Works and the Department of Development and Planning.

To insure that the Chicago Water and Sewer Systems will continue to meet the needs of a growing area, the preliminary program prepared for the period of 1969 to 1973 calls for a total estimated expenditure of \$184,073,000.

It is proposed that, of this total, \$97,718,000 be devoted to improvements in the Water System's tunnels and shafts, filtration plants, pumping stations and distribution system.

The map on pages 12 and 13 indicates the service area of the Chicago Water System, which by the end of 1968 included the City of Chicago and 70 suburban communities. The entire area covers a total of 436 square miles. The City of Chicago, with its 3,551,000 residents, comprises 227 of those square miles. The remaining 209 square miles of suburban areas, with a combined population of 1,152,000 persons, complete the scope of the Water System service area.



The map also shows the locations of the various major Water System facilities, such as filtration plants, intake cribs, pumping stations, water tunnels and distribution mains.

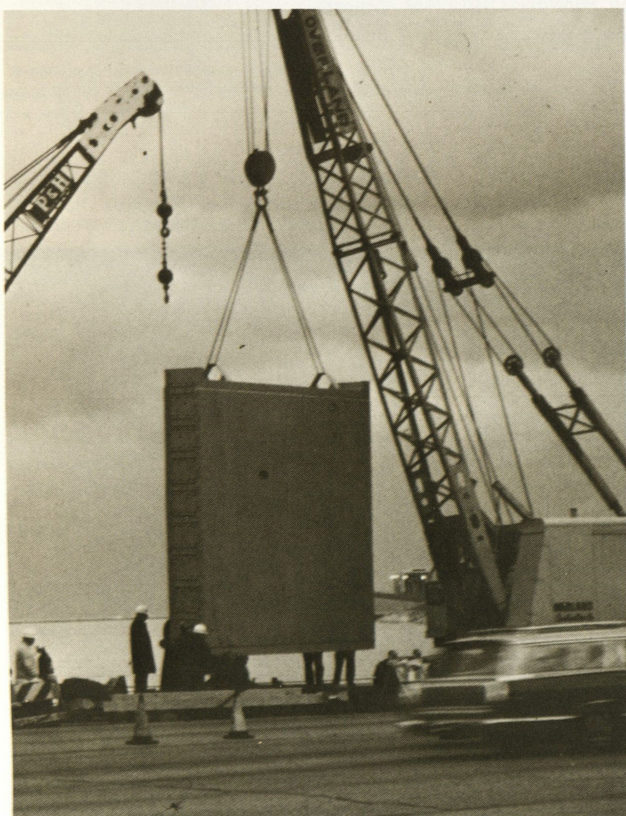
Following the service area map, capital investments made since the Department of Water and Sewers was established in 1953 and estimated expenditures scheduled for improvements during the five-year period, 1969 through 1973, are each tabulated and charted by type of facility. The increases in the capacities of the most important facilities of the Water System are also shown graphically.

During 1968, a seven-year program was initiated at the South Water Filtration Plant, aimed toward the replacement of the existing instrumentation with the most modern equipment. When the goal of this program has been attained, the South Plant will be monitored by a computer-data logger and the chemical feed system will have been completely automated, using equipment very similar to that in use at the Central Water Filtration Plant.

Plans were developed this year to modernize the Thomas Jefferson Pumping Station. The present pumps at this station have been in operation for over 40 years. Due to changes in water demands, changes in the water main distribution system, the realignment of pumping station areas and the successful operation of the new automatic Lake View Station, it is advisable that the Thomas Jefferson Station be reconstructed and fundamentally altered to bring it into gear with the demands that will be placed upon it in the area it will serve.

A study is being conducted by a consulting firm, retained by the Department, to ascertain and suggest the changes and additions that should be made in the Chicago Water System to continue providing a high level water supply service to Chicago and the suburban communities using Chicago water. The results of this study will enable the Department to project the water demands during the years to 2000 and to take the steps necessary to meet the demands.

Gate being lowered in tunnel shaft at Lake Shore Drive and Chicago Avenue in order to complete tunnel connection between Central Water Filtration Plant and the Dever Crib.



S E W E R S

It was 134 years ago that Chicago borrowed \$60 to pay for the digging of trenches to channel storm water runoff from State Street into the Chicago River. This first step led to the vast drainage system which serves the City today. In 1854, there were only four and one-half miles of sewers underground, and during the following year, the Board of Sewerage Commissioners recommended that the City construct a system that would discharge into Lake Michigan. The first six miles of sewers were constructed under this program in 1856. Since then, however, the system was improved to stop the sewers from emptying into the Lake. Beginning at the turn of the Century, the direction of the Chicago River's flow was reversed and in 1922 the Calumet River's flow was diverted to prevent sewage from reaching Lake Michigan. Both rivers in their original state had been natural tributaries to the Lake. A system of locks and control structures had to be built in order to regulate the flow of the North Shore Channel and the Chicago and Calumet Rivers.

Domestic and industrial wastes are discharged through private drains which are in turn connected to the City-maintained sewers in the streets, designated as lateral, branch or trunk, depending upon the area they serve. The larger trunk sewers are diverted, at appropriate locations, into giant intercepting sewers which feed into the waste-water plants operated by the Metropolitan Sanitary District of Greater Chicago—a separate government and taxing body.

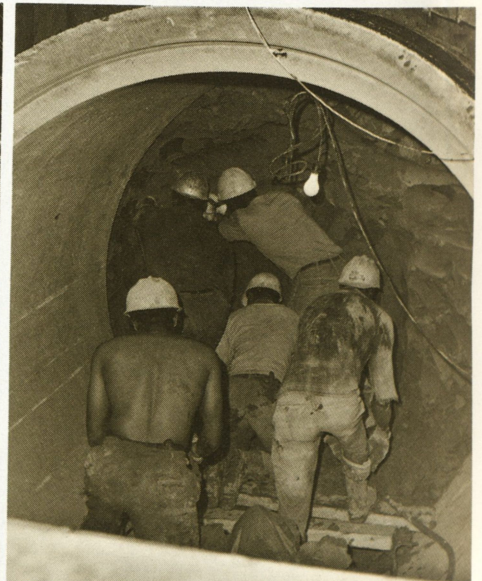
Bureau of Sewers crew repairing a brick sewer.



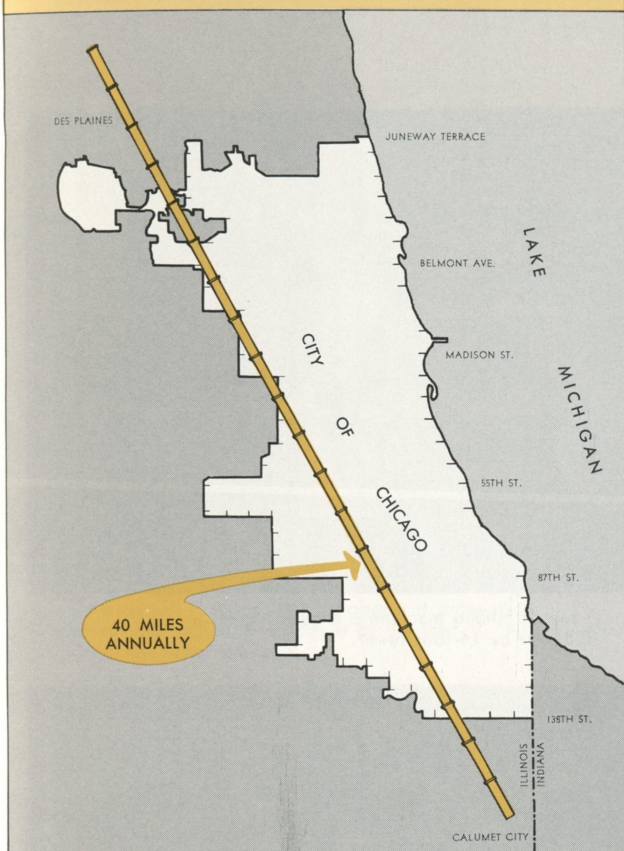
Sheeting being installed over break in nine-foot diameter concrete sewer for repair operations.



Mining operation ahead of jacking pipe underneath railroad tracks.



ANNUAL AVERAGE
MILES OF SEWERS CONSTRUCTED
1953-1968



Sewers are laid in various areas—but, if the average amount of sewers constructed each year since 1953 were placed in a straight line it would be 40 miles long.

A catch basin is being cleaned with modern equipment. An eductor is used to collect debris for proper disposal.



Of the approximately 4,100 miles of existing sewers, many are of brick construction, as shown.



New concrete sewers are being constructed by Bureau forces.



Under the supervision of the Department of Public Works, substantial progress was made in 1968 on the construction of the Lawrence Avenue Underflow Sewer System, which began during the preceding year and is scheduled to be completed near the end of 1970. When this new system is finished, during normal periods sanitary drainage will continue to be collected by conventional sewers and discharged into interceptors of the Metropolitan Sanitary District for treatment. However, during periods of heavy flow resulting from storm runoff when the capacity of the regular sewers will be exceeded, the excess runoff will be diverted into the new deep-level Lawrence Avenue Sewer rather than overflow into the Chicago waterways. In this way, the large quantities of storm water and sanitary drainage will be stored until the waste treatment plants of the Sanitary District are again able to cope with the stored storm and sanitary flow. An area of approximately 3,620 acres will benefit under this improvement.

Since the establishment of the Department of Water and Sewers in 1953, the Chicago Sewerage System has grown by about 540 linear miles, and now consists of some 4,078 miles of sewers. This system also includes 146,405 manholes and 212,022 catch basins.

During 1968, the Bureau of Sewers, with its own forces, constructed 9,998 feet of new sewers, ranging in size from 0.8 to 3.5 feet in diameter. Most of this work was financed by Sewer Bond Funds and consisted of short branch sewer extensions.

SEWERS

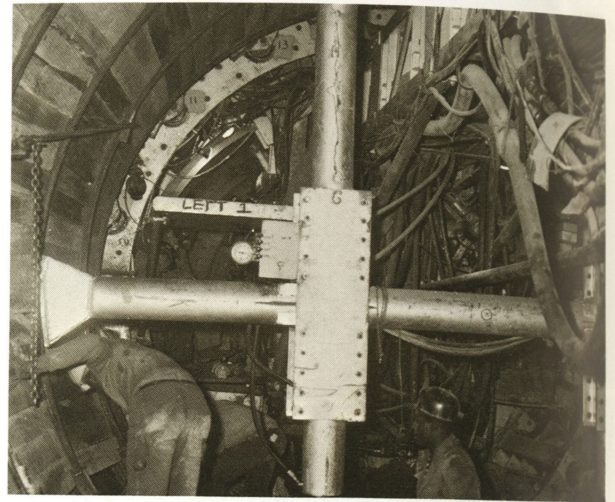
These extensions improved drainage conditions in local areas which had not previously benefited under the Auxiliary Outlet Sewers Program, which was started in 1947.

At the end of 1968, the Bureau initiated an expanded preventive maintenance program for sewer scraping. Under this program, selected high maintenance areas of the City will be scheduled for regular sewer scraping on a routine basis. The Bureau will continue to respond to emergencies. The primary purpose of the preventive maintenance program is to reduce the number of emergency assignments.

In addition to scraping sewers, the cleaning and repair crews performed a variety of other services during the year, including cleaning 412,831 catch basins and repairing 429 sewer breaks, 8,325 street catch basins and 2,261 manholes. During 1968, 142,790 tons of debris were removed.

Supervisory personnel are constantly on the alert for new ideas or methods of improving procedures and equipment for cleaning and servicing City sewers. For example, a series of tests were recently conducted on the use of chemical additives to facilitate the cleaning of sewers and catch basins. Results indicated that the chemicals tested were effective in loosening the mud and silt deposits which had built-up in some sewers so that they could be floated away. The use of such chemical additives and high pressure hoses fed from mobile water flushing units helps to keep the sewer system operating at top efficiency.

The Bureau's personnel include a staff of inspectors who are responsible for seeing that all connections to the Chicago Sewer System meet City specifications.

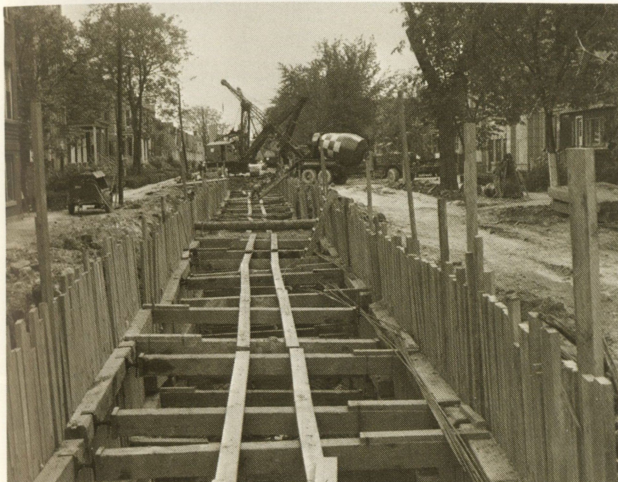


A tunnel mining machine is excavating for a 12.6-foot by 14-foot sewer.



Locomotive and cars are removing excavated earth.

Ribs and lagging used in sewer construction are shown. Light from shaft opening is visible in background.



Sheeting and bracing used for open cut excavation in the construction of a 12 foot by 9.6 foot monolithic sewer is shown.



Forms and reinforcing steel are set for the monolithic sewer.

In reaping the benefits of expanding technology, field forces have adopted some of the latest methods in performance of the repair, maintenance and construction activities for which they are responsible. A mobile radio communication system is utilized in the control and direction of crews and equipment in the field. Certain mobile equipment units and the vehicles of key supervisory personnel are furnished with two-way radios. This method of control plays an important role in the handling of emergency situations, such as major sewer breaks and natural emergencies or when giving special assistance to the Chicago Fire Department in keeping the streets surrounding a burning structure clear of water and ice, and in preventing the flooding of nearby properties.

Another of the Bureau's responsibilities is the maintenance of a system of bench monuments, which are points of known elevation established for the use of architects, engineers and surveyors to determine correct elevations when constructing buildings, sewers, bridges and other structures which must match the elevations of existing improvements within close tolerances. Such monuments are composed of cylindrical columns of concrete, eight feet long and 15 inches in diameter. They are buried in the ground and support a stainless steel pin, the elevation of which is exactly established. The Bureau also establishes street and curb elevations and, in this way, is able to regulate development and construction. In low-lying areas, street grades are established above existing ground levels so as to encourage the filling in of these areas for better drainage, thereby reducing the risk of flooding during severe rainstorms. During 1968, the Bench and Grade Section engineers of the Bureau of Sewers constructed no new monuments but ran 142 miles of precise levels necessary to fix the elevation of 38 standard bench monuments and establish 127 new street grades.

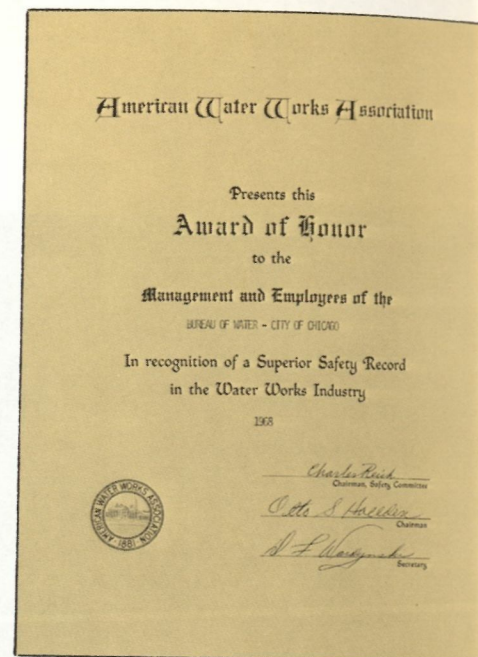


The concrete 12 by 9.6 foot monolithic sewer is now completed.

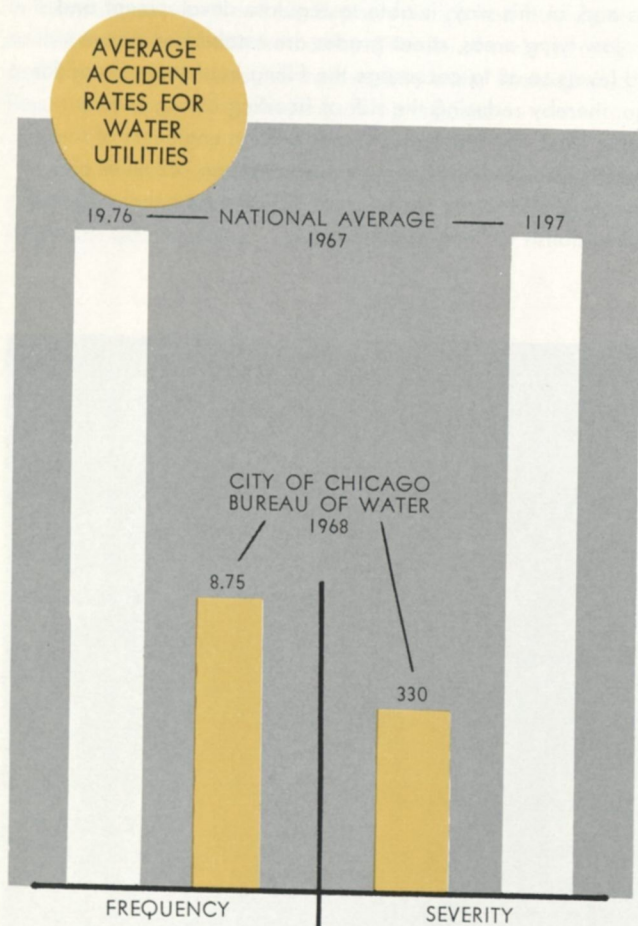
SAFETY

Chicago was one of the first large cities in the country to develop and put into effect a formal safety program designed to protect employees of its Water and Sewer System and the public from the hazards attendant to Departmental activities. The intensive promotion of this comprehensive safety program has brought excellent results, a conclusion supported by the Department's 1968 Annual Accident Data Report which summarizes the accident experience during the year in all activities of the Bureau of Water and Bureau of Sewers.

Safety committees and safety representatives in the various operating units of the Department assist the line supervisors in carrying out the prescribed rules governing safe work practices. It is to be noted that the rule



Award from American Water Works Association lauds Department's safety record for 1968.



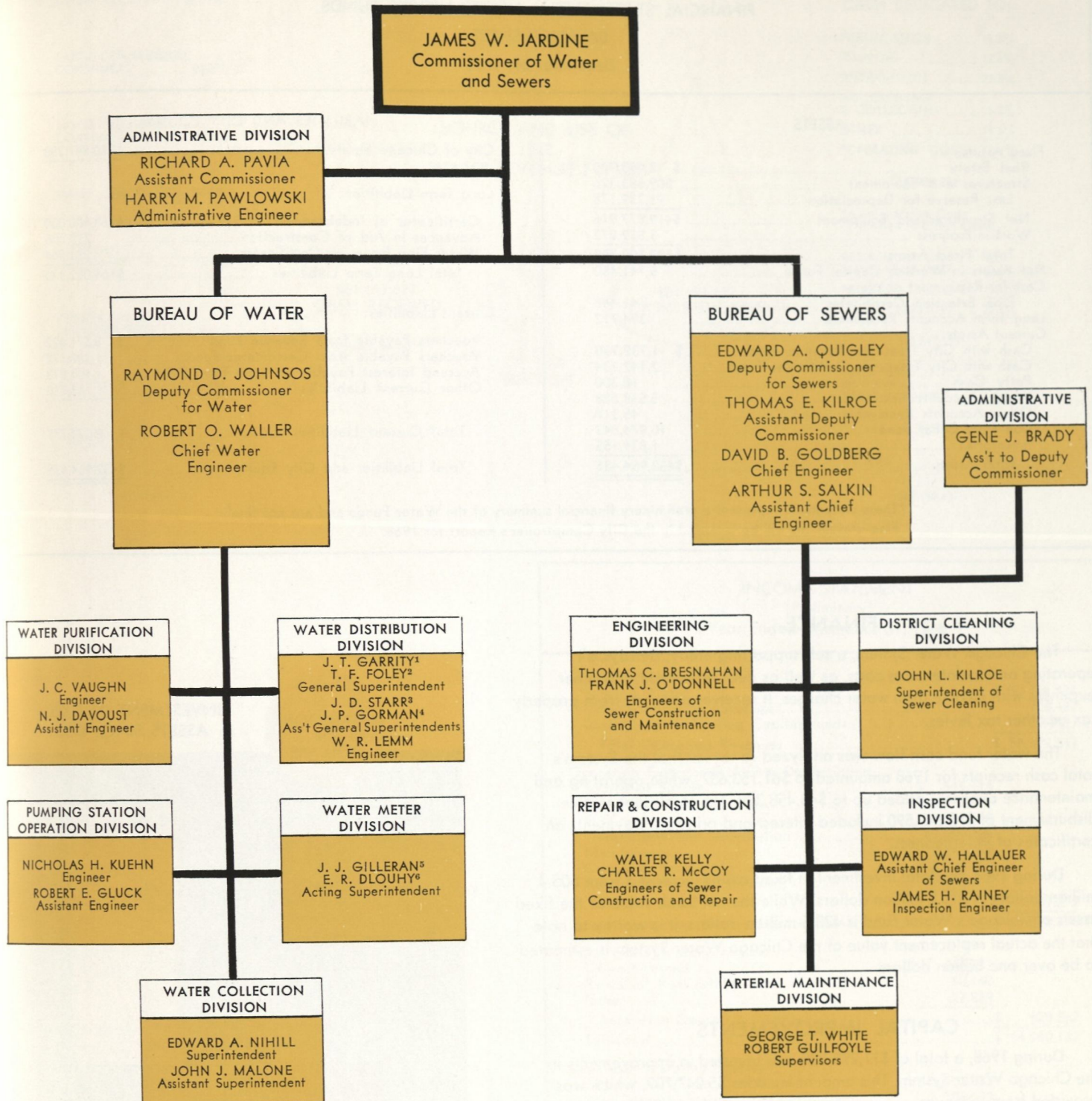
pertaining to the reporting of accidents is strictly enforced throughout the Department to make certain that all accidents are accurately reported and properly recorded. Many items of safety equipment are supplied to individual employees for their protection. Safety Bulletins in which suggestions are made for avoiding accidents at work, at home and on the road are sent periodically to all employees in the Department.

The 1968 Frequency Rate for the Bureau of Water was 8.75 and the Severity Rate was 330. By comparison, the Bureau's Frequency Rate is considerably less than half, and the Severity Rate only 27.57 percent of the latest national average for water utilities, as published by the National Safety Council.

The Department's record testifies to the effectiveness of its safety measures. In compliance with requests, it has been sending its Annual Accident Data Report to many private and governmental organizations that have adopted the basic essentials of this Department's safety program.

Lost time due to accidents cannot be recovered and thereby increases operating costs. The significant reduction in human pain and in lost time due to work accidents in Departmental activities has more than compensated for the efforts expended in the intensive promotion of safe work practices. The many National Safety Council and the American Water Works Association awards won by the Department of Water and Sewers since its establishment are further proof of employees' efforts to promote, enforce and follow safe work practices.

DEPARTMENT OF WATER AND SEWERS



¹Deceased March 27, 1968, ²Appointed May 16, 1968, ³Appointed February 16, 1968, ⁴Appointed June 16, 1968, ⁵Deceased November 12, 1968, ⁶Appointed December 5, 1968.

ADMINISTRATION AND FUNCTIONS

The Commissioner of Water and Sewers, as chief executive officer of the Department, is directly responsible to the Mayor and the Chicago City Council. Each of the component Bureaus, the Bureau of Water and the Bureau of Sewers, is headed by a Deputy Commissioner.

The Bureau of Water is entrusted with the operation and maintenance of the Chicago Water System which furnishes a good quality, filtered water to all of Chicago and 70 suburbs. The Bureau is composed of five Divisions: (1) the Purification Division which operates and maintains the two largest water treatment plants in the world and monitors the water supply to insure its potability; (2) the Pumping Station Operation Division which operates and maintains four water intake cribs and eleven pumping stations; (3) the Water Distribution Division which operates and maintains the water distribution system and constructs additional water mains as needed; (4) the Meter Division which operates the meter repair shop, installs large meters, inspects and makes repairs of meters in the field and main-

tains complete records on all meters; and (5) the Collection Division which reads meters in service and bills, collects and accounts for water charges.

The Bureau of Sewers operates and maintains the Chicago Public Sewer System which collects and transports sanitary and industrial wastes and surface water drainage to the interceptor sewers of the Metropolitan Sanitary District of Greater Chicago. The Bureau is composed of the Administrative Division and five other Divisions: (1) the Engineering Division which plans and designs sewer extensions, betterments and major repairs; (2) the Cleaning Division which scrapes and flushes sewers and cleans catch basins on a district basis; (3) the Repair and Construction Division which makes repairs to the Sewer System on a district basis; (4) the Arterial Maintenance Division which cleans and repairs City arterial highway sewers; and (5) the Inspection Division which supervises sewer construction, the installation of connections and the underground work of others done near public sewers to protect the sewers from damage.

FINANCIAL STATEMENTS*—WATER WORKS FUNDS

BALANCE SHEET

December 31, 1968

ASSETS

Fixed Assets:	
Real Estate	\$ 2,033,768
Structures and Equipment	509,683,326
Less Reserve for Depreciation	91,739,178
Net Structures and Equipment	\$419,977,916
Work-in-Progress	3,522,873
Total Fixed Assets	\$423,500,789
Net Assets in Working Capital Funds	6,741,480
Cash for Repayment of Water	
Pipe Extension Certificates	141,448
Long Term Accounts Receivable	394,712
Current Assets:	
Cash with City Treasurer, Revenue Fund	\$ 1,732,730
Cash with City Treasurer, Certificates Fund	2,142,334
Petty Cash	18,300
Water Accounts Receivable	5,538,528
Other Accounts Receivable	45,316
Due from Other Funds	10,874,643
Inventories	1,834,155
Total Assets	<u>\$452,964,435</u>

LIABILITIES AND CITY EQUITY

City of Chicago Equity	<u>\$280,891,288</u>
Long Term Liabilities:	
Certificates of Indebtedness	\$163,500,000
Advances in Aid of Construction	220,806
Water Pipe Extension Certificates	281,564
Total Long Term Liabilities	<u>\$164,002,370</u>
Current Liabilities:	
Vouchers Payable from Revenue Fund	\$ 5,571,422
Vouchers Payable from Certificates Fund	1,380,172
Accrued Interest Payable on Long Term Debt	1,103,973
Other Current Liabilities	15,210
Total Current Liabilities	<u>\$ 8,070,777</u>
Total Liabilities and City Equity	<u>\$452,964,435</u>

*These statements represent a preliminary financial summary of the Water Funds and are not final. Final statements will be included in the City Comptroller's Report for 1968.

FINANCE

The Chicago Water System, a self-supporting utility, defrays all operating and maintenance costs, as well as debt retirement and other expenses with income from water charges. It receives no funds from property tax or other tax levies.

The water fund cash flow was analyzed to reveal that the System's total cash receipts for 1968 amounted to \$61,153,637, while operating and maintenance expenses added up to \$43,458,338. The total debt service disbursement of \$12,647,590 included interest and principal payments on certificates of indebtedness.

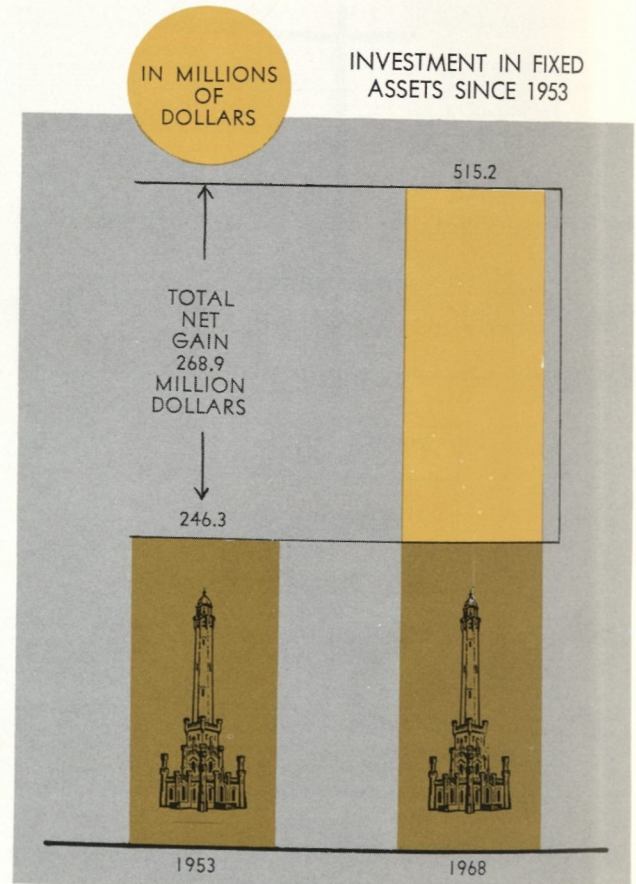
During 1968, the total investment in fixed assets increased from 505.4 million dollars to 515.2 million dollars. While the net book value of the fixed assets of Chicago's Water Fund is 423.5 million dollars, it is worthy to note that the actual replacement value of the Chicago Water System is estimated to be over one billion dollars.

CAPITAL IMPROVEMENTS

During 1968, a total of \$11,293,330 was invested in improvements in the Chicago Water System. This amount includes \$5,047,709, which was provided from revenues.

Included in the Capital Improvements Program expenditures for the year were \$2,244,013 for filtration plant facility improvements, \$6,064,106 for construction of new water mains, \$1,377,505 for improvements of water tunnels and cribs, \$1,040,080 for pumping station improvements, and \$567,626 for the purchase of new equipment.

The preliminary Five-Year Capital Improvement Program for the Chicago Water System, which was planned, in cooperation with the Department of Public Works and the Department of Development and Planning, to cover the period from 1969 to 1973 (subject to annual revisions and approval by the City Council), calls for a total investment of \$97,718,000, which includes: \$25,300,000 for tunnels and shafts; \$14,590,000 for the filtration plants; \$18,966,000 for pumping stations; and \$38,862,000 for water main construction and maintenance.



CASH RECEIVED FROM:

LARGE COMMERCIAL
CONSUMERS 23.2%

LARGE INDUSTRIAL
CONSUMERS 16.3%

SMALL CONSUMERS.. 15.5%

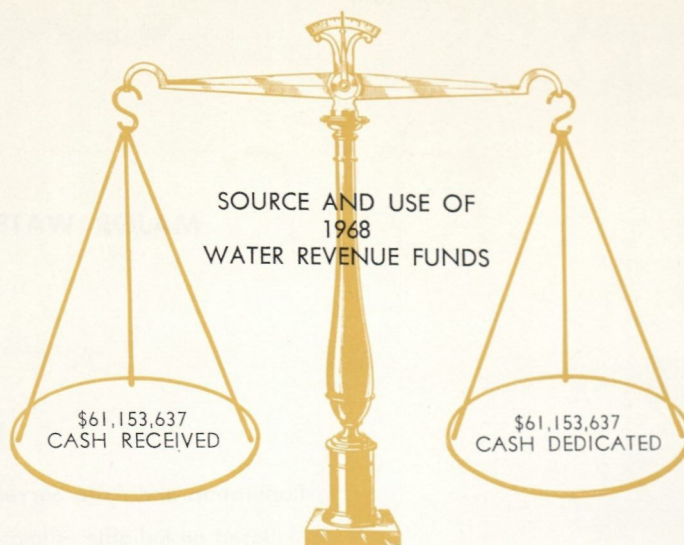
SUBURBAN
CONSUMERS 20.8%

RESIDENTIAL
(ASSESSED RATES) 19.0%

ALL OTHER 5.2%

TOTAL100.0%

\$61,153,637



CASH DEDICATED TO:

PURIFICATION 15.8%
PUMPING 12.6%
DISTRIBUTION 23.8%
ACCOUNTING
& COLLECTING 5.3%
OTHER 13.6%
*OPERATING COSTS.. 71.1%

\$43,458,338

*Administrative Costs
Pro-rated to Direct Costs

RETIREMENT OF
LONG TERM DEBT..... 10.6%
INTEREST 10.1%
DEBT SERVICE..... 20.7%

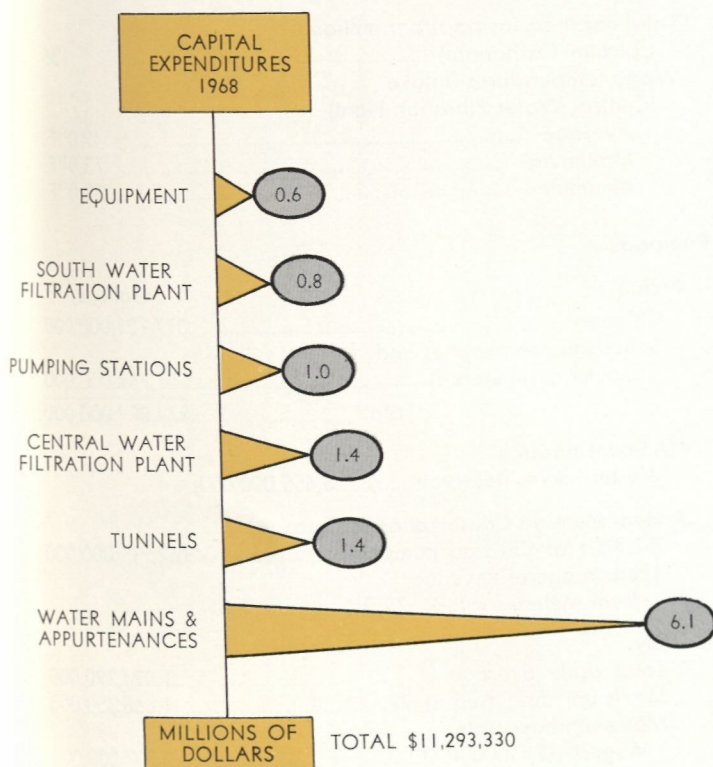
\$12,647,590

CASH USED
IN CAPITAL
IMPROVEMENTS 8.2%

\$5,047,709

TOTAL100.0%

\$61,153,637



INCOME STATEMENT (Preliminary) Year Ended December 31, 1968

Operating Revenues:	
Sales of Water	\$ 57,734,833
Other Operating Revenues	704,487
Operations of Working Capital Funds	(109,473)
Total Operating Revenues	\$ 58,329,847
Operating Expenses Excluding Depreciation:	
Source of Supply	\$ 545,114
Power and Pumping	6,897,611
Purification	9,387,510
Transmission and Distribution	13,509,368
Maintenance	7,945,010
Customer Accounting and Collection	2,809,023
Administration and General	2,875,636
Total	\$ 43,969,272
Operating Income Before Depreciation	\$ 14,360,575
Add Non-Operating Income:	
Interest Earned	\$ 566,533
Rental of Real Estate	40,140
Other	22,889
Total Non-Operating Income	\$ 629,562
Sub-Total	\$ 14,990,137
Less Non-Operating Expense:	
Interest on Water Certificates	\$ 6,107,552
Less Interest Charged to Construction.....	106,179
Net Interest Expense	\$ 6,001,373
Other	61,411
Total Non-Operating Expense	\$ 6,062,784
Net Income Before Depreciation	\$ 8,927,353
Depreciation Expense	7,789,349
Net Income Carried to City Equity.....	\$ 1,138,004

STATEMENT OF CHANGE IN CITY EQUITY (Preliminary) Year Ended December 31, 1968

City Equity January 1	\$279,628,320
Add	
Net Income	\$ 1,138,004
Surplus Adjustment	124,964
	\$ 1,262,968
City Equity December 31	\$280,891,288

1968

MAJOR WATER AND SEWER STATISTICS

SEWERS

Existing Sewer System

Miles of Sewer	4,077.85
Catch Basins	212,022
Manholes	146,405

1968 New Sewer Construction

Miles of Sewers—all sizes	26.24
Catch Basins	760
Manholes	967

Inspections 163,726

Complaints Handled 28,533

Repairs

Total Number of Sewer System Repair Jobs.....	11,544
Main Sewer Breaks	429
Catch Basins	8,325
Manholes	2,261
Gutter Grates and Basin Outlets	529

Cleaning

Sewers Scraped—Feet	9,044,019
Catch Basins Cleaned	412,831

Street Grades Established and Approved by City Council

127

Standard Bench Monuments and Ordinary Benches Established

236

Receipts

House Drain Permit Fees	85,765
Other Permit Fees	62,346
Special Deposits	125,108
Out-of-Town Connection Fees	66,906
Drain Layers' License Fees	38,400
Total Receipts	\$ 378,525

WATER

Population and Area Served

(Based on Reliable estimates)

Population supplied:

Chicago (1960 U.S. Census 3,550,404).....	3,551,000
Suburban (Year-end census as revised).....	1,152,000
Total	4,703,000

Area served (in square miles):

Chicago	227
Seventy suburbs	209
Total	436

Per Capita Consumption

	Gallons Per Day
Chicago	244
Suburban	137
Average	218

Chemical and Physical Qualities of Water

Total hardness (as parts per million Calcium Carbonate)	136
Water temperatures: Intake (Central Water Filtration Plant)	
Average	49.0°F.
Maximum	73.0°F.
Minimum	32.0°F.

Pumpage

Annual	Gallons
Chicago	317,131,000,000
Suburban communities and industries (metered)	57,758,000,000
Total*	374,889,000,000

*(Amount through
Western Ave. Reservoir3,655,000,000)

Annual Metered Consumption in Chicago
(51.4% † of Chicago pumpage).....162,911,000,000
†Percentage of Revenue
from Metered rates: 79.9%

Daily

Total daily average	1,024,290,000
Maximum day, August 22.....	1,666,350,000
Maximum hour (rate) August 22, 4:00 P.M.....	2,207,000,000
Daily Average—Chicago	866,500,000
Daily Average—Suburban	157,800,000

WATER

Purity Control

Laboratory tests made:	
Bacteriological Laboratory	129,407
Microscopically for plankton	7,740
Chemical Laboratory	72,661
Electron Microscope	5,338
Control Laboratory S.W.F.P.....	140,429
Control Laboratory C.W.F.P.....	212,256
Total tests made.....	567,831

Bacteriological Results

Annual average coliform organisms per 100 ml*

	South District		North & Central District	
	Crib	Shore	Crib	Shore
Raw	19.0	54.0		120
Plant outlet	0.014		0.0035	
Pumping stations	0.050		0.040	
Distribution system	0.017		0.061	

*U. S. Public Health Service Standard for safe drinking water permits a maximum average of 1.0 coliform organisms per 100 ml.

Purification Treatment

	Gallons
Complete Filtration Treatment.....	388,125,000,000

Chemicals Applied—Tons

	SWFP	CWFP
Chlorine	1563	2307
Aluminum Sulfate (17% Al_2O_3).....	5455	9067
Activated Carbon	2438	1573
Lime	3894	7087
Ferrous Sulfate (as $FeSO_4$).....	2499	3029
Anhydrous Ammonia	132	
Sodium Silicate	27	
Hydrofluosilicic Acid (As Fluorine)	487	787
Caustic Soda (NaOH)		35

Supply

Crib intakes in service	1
Crib intakes on stand-by service.....	3
Shore intakes	2
Miles of water supply tunnels under lake and land (6 to 20 feet in diameter).....	72.3

Pumping

Pumping stations	11
Pumps available for service	53
Installed pumping capacity (Million gallons per day)	2995

Annual Pumpage

	Million Gallons
By electrically driven pumps	147,537
By steam driven pumps	227,352
Total annual pumpage.....	374,889
Coal used by steam powered pumps (tons).....	125,682
Electric power used by electrically powered pumps (kilowatt hrs.).....	74,786,237

Distribution

Water Mains: (in miles)	
In use—December 31, 1968.....	4,117.71
Extended	27.54
Abandoned	17.10
Net addition to system	10.44
Diameter of pipe (inches)	4 to 60
Fire Hydrants:	
In use—December 31, 1968.....	45,864
Installed	306
Abandoned	186
Net Increase	120
Gate Valves:	
In use—December 31, 1968.....	42,658
Installed	449
Abandoned	205
Net Increase	244
Pressure range in mains	
(lbs. per square inch).....	28 to 58
Average pressure at curb	
(lbs. per square inch).....	36
Miles of pipe tested for underground leakage.....	2063.97
Premises inspected—house to house leakage survey	
	56,480
Repaired main breaks—4 inch to 36 inch in diameter.....	
	228

Meters

In service—December 31, 1968.....	163,723
Installed by Master Plumbers	3,017
Installed by Water Distribution Division.....	455
Total	3,472
Removed	1,503
Net Increase	1,969
Repaired on premises	16,597
Repaired in shops	16,210
Tested	18,678
Non-metered (assessed rate) services	347,872
Total Services (assessed & metered).....	511,595

Supplements covering complete 1968 water or sewer statistics are available upon request.

DEPARTMENT OF WATER AND SEWERS
ROOM 403, CITY HALL
CHICAGO, ILLINOIS 60602

UNIVERSITY OF ILLINOIS-URBANA
3 0112 114157669

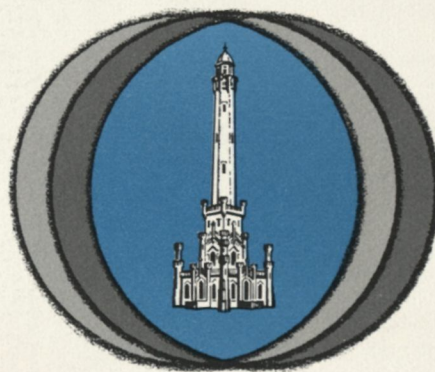
CITY OF CHICAGO

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DEPARTMENT OF WATER AND SEWERS

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1968 ANNUAL REPORT



1968